CLAIMS

What is claimed is:

1. A heat exchanger comprising:

a first plate;

a second plate joined about a periphery thereof to the first plate, the first plate and second plate having substantially planar spaced apart central portions defining a fluid flow chamber therebetween having an inlet opening, an outlet opening and spaced apart first and second ends;

a flow circuiting barrier in the flow chamber extending from substantially the first end of the fluid flow chamber to a barrier termination location that is spaced apart from the second end of the fluid flow chamber, the barrier dividing the fluid chamber into first and second flow regions in flow communication with each other between the barrier termination location and the second end of the fluid flow chamber;

a turbulizer having rows of fluid flow augmenting convolutions, the turbulizer located in the first and second flow regions and including portions defining a notch area therebetween, at least part of the notch area being between the barrier termination location and the second end.

2. The heat exchanger of claim 1 wherein the notch area decreases inward from the second end of the fluid chamber and extends no closer to the first end than the barrier termination location.

3. The heat exchanger of claim 2 wherein the notch area is substantially V-shaped.

4. The heat exchanger of claim 3 wherein the V-shaped notch area has its apex adjacent the barrier termination location.

5. The heat exchanger of claim 1 wherein at least a portion of the barrier is integrally formed into the turbulizer and the turbulizer together with the notch area is substantially the same size as the fluid chamber.

6. The heat exchanger of claim 5 wherein the turbulizer is formed from metal and brazed to the central portions of the first and second plates, the barrier portion formed in the turbulizer being a crimped area along which the metal turbulizer is closed.

7. The heat exchanger of claim 5 wherein the fluid chamber is substantially rectangular in shape.

8. The heat exchanger of claim 1 wherein the inlet and outlet openings are located near the first end of the fluid chamber and the barrier includes a portion integrated into the turbulizer and a separately formed barrier block, the barrier block being located between the first and second flow regions and having one end tightly conforming to the first end of the flow chamber and an other end abutting against the barrier portion integrated into the turbulizer.

9. The heat exchanger of claim 8 wherein the barrier block is received in a barrier block notch located in the turbulizer at the first end of the flow chamber.

10. The heat exchanger of claim 8 wherein the barrier block is formed of metal and secured to the first and second plates by brazing.

11. The heat exchanger of claim 1 wherein the first and second plate have abutting peripheral edge portions joined together to form a flange including a plurality of pairs of aligned openings through the first and second plates, each pair of openings including an opening of one size through one of the first or second plates aligned with an opening of a different size through the other of the first or second plates.

12. The heat exchanger of claim 11 wherein the at least one of the first and second plates is formed from braze-clad metal.

13. The heat exchanger of claim 1 including a plurality of air-side fins on the planar portion of at least one of the first and second plates.

14. The heat exchanger of claim 1 wherein the first plate is a planar sheet and the planar central portion of the second plate has an integral sidewall flange provided about a peripheral edge thereof, the sidewall extending towards and sealably connected to the first plate.

15. The heat exchanger of claim 1 including a second flow circuiting barrier in the flow chamber extending from substantially the second end of the fluid flow chamber to a second barrier termination location that is spaced apart from the first end of the fluid flow chamber, the second barrier providing a third flow region in the fluid chamber that is in flow communication with the second flow region between the second barrier termination location and the first end of the fluid flow chamber, the first and second barriers circuiting fluid through the fluid chamber in a serpentine path;

the turbulizer also being located in the third flow region and including further portions defining a further notch area therebetween, at least part of the further notch area being between the second barrier termination location and the first end.

16. The heat exchanger of claim 15 including a third flow circuiting barrier in the flow chamber extending from substantially the first end of the fluid flow chamber to a third barrier termination location that is spaced apart from the second end of the fluid flow chamber, the third barrier providing a fourth flow region in the fluid chamber that is in flow communication with the third flow region between the third barrier termination location and the second end of the fluid flow chamber, the first and second and third barriers circuiting fluid through the fluid chamber in a serpentine path;

the turbulizer also being located in the fourth flow region and including other portions defining a third notch area therebetween, at least part of the third notch area being between the third barrier termination location and the second end.

17. A heat exchanger comprising:

a first plate;

a second plate joined about a periphery thereof to the first plate, the first plate and second plate having substantially planar spaced apart central portions defining a fluid flow chamber therebetween having a first end and a second end and an inlet opening and an outlet opening; and

a turbulizer plate located in the flow chamber and having rows of fluid flow augmenting convolutions, the turbulizer plate extending from substantially the first end to the second end of the flow chamber and having a plurality of the convolutions crimped for forming a flow circuiting barrier extending from the first end to a barrier end spaced apart from the second end for dividing the flow chamber into adjacent flow regions that are in flow communication between the barrier end and the second end, the turbulizer plate defining a notch area that decreases in area inward from the second end for providing a turbulizer plate free area in the fluid chamber between the barrier end and the second end.

18. The heat exchanger of claim 17 wherein the notch area is substantially V-shaped, having its apex between the barrier termination location and the second end.

19. A multi-pass heat exchanger including:

first and second plates forming a fluid chamber therebetween having an inlet opening and an outlet opening;

a turbulizer plate having rows of fluid flow augmenting convolutions in the fluid chamber, the turbulizer plate including at least one barrier dividing the fluid chamber into first and second pass regions such that fluid flowing in the fluid chamber flows around an end of the barrier when flowing from the first pass region to the second pass

regions, the turbulizer plate having portions defining a notch area therebetween for fluid to pass through when flowing in the fluid chamber around the end of the barrier from the first pass region to the second pass region.

20. The heat exchanger of claim 19 wherein the first and second pass regions are side-by-side such that fluid flows in a generally U-shaped path around the end of the barrier and the notch area gets larger further from the end of the barrier.